Acetylene

APPARATUS.

FIAT LUX.

WATMSLEY, FULLER & CO.

MANUFACTURERS

CHICAGO

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We cannot be responsible for goods sent by mail.

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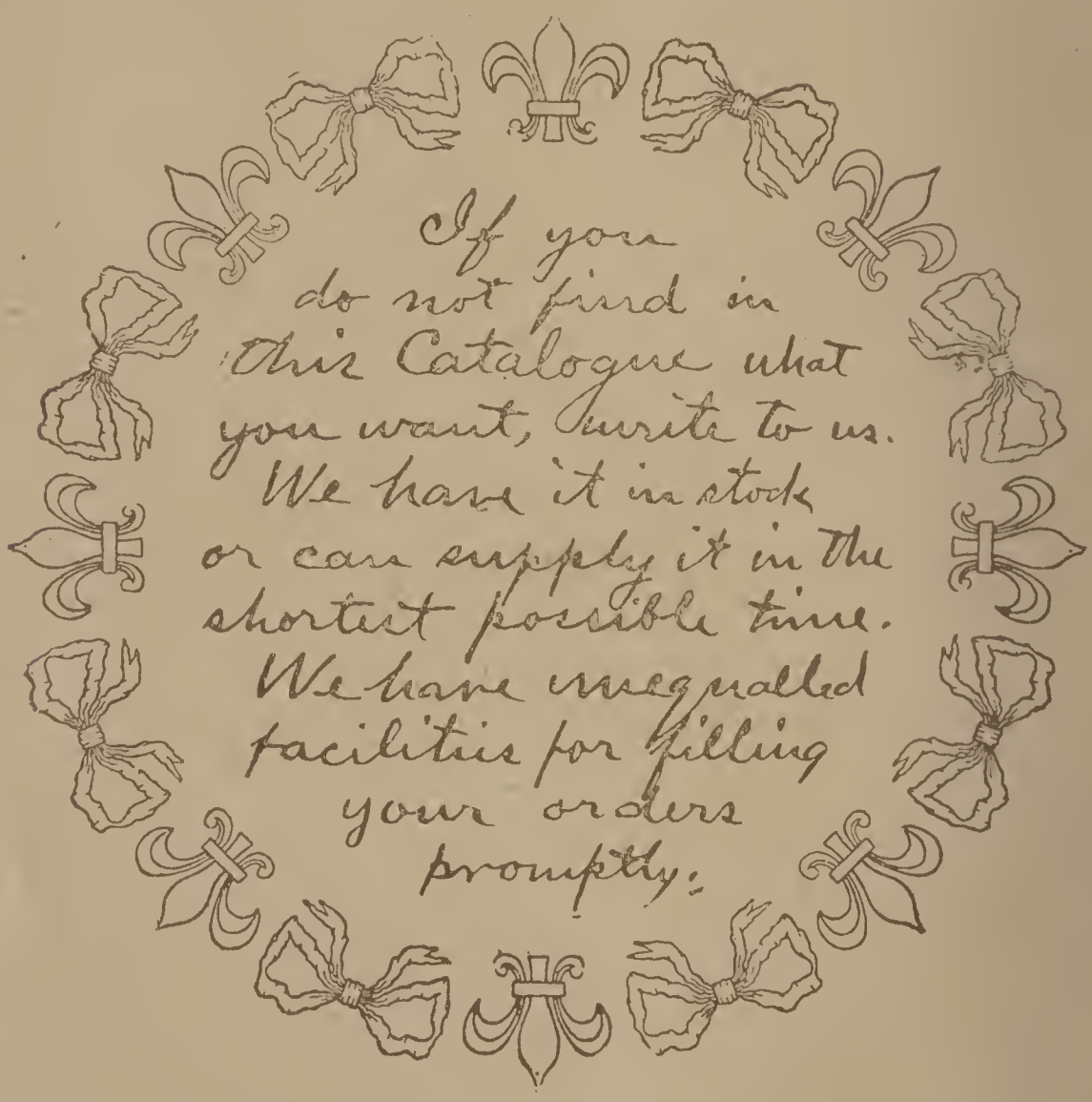
We take the greatest possible care in packing, but cannot be responsible for breakage unless goods are insured.



WALMSLEY, FULLER & CO.

Manufacturers

The "MONITOR" Automatic Acetylene Gas Generators and Appliances

PHYSICAL, CHEMICAL and ELECTRICAL APPARATUS

134-136 Wabash Avenue,

CHICAGO.

ACETYLENE APPARATUS

FOR

LIGHT, HEAT

AND

POWER

FIAT LUX.

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134-136 WABASH AVENUE,

CHICAGO.

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ILLUSTRATIONS.

Announcement.

The demand for a light to take the place of oil and ordinary gas has been so great that we have given the subject very careful attention.

Acetylene meets the requirements of this improved light. This gas is generated from Calcic Carbide by the use of water.

After many experiments and a large expenditure of time and money, we have perfected an Automatic Generator for producing Acetylene from Calcic Carbide which is safe, economical, inexpensive, durable, reliable and in every way satisfactory.

These generators in batteries are adapted to lighting cities, towns and villages through small and inexpensive mains. Small sizes are made for lighting churches, halls, theaters, houses and single rooms, and can also be used to take the place of the ordinary kerosene lamp for table use.

We manufacture special generators for lighting ships, steam yachts, railway trains and street cars, and are prepared to furnish generators for light-houses and signal stations.

We also make generators for special work, such as lighting elevators in buildings, etc. One form of these generators is particularly adapted to microscopic, stereopticon and photographic purposes.

We solicit correspondence in regard to any special lighting required.

Supplementary circulars will be issued from time to time giving information as to new applications of this light.

Walmsley, Fuller & Co.

Manufacturers Scientific Apparatus,
134-136 Wabash Avenue,
Chicago, Ill., U. S. A.

The "Monitor" Automatic Acetylene Generator No. 3.

See pages 16 and 19.

Acetylene Gas.

THE LIGHT.

PURITY.

Acetylene Gas burns with a flame, the light of which resembles that of the sun more than any other known illuminant. Under its rays, which are the purest white, all colors and shades are accurately distinguished.

POWER.

A large incandescent lamp of 100-candle power, when placed before the white glow of one small one-foot burner using Acetylene, will cast a shadow, showing that the latter is more powerful than the former.

The filaments of incandescent lamps appear like "red-hot hair-pins," as one observer graphically remarked. One one-foot burner using Acetylene gives more light than six five-foot burners using ordinary gas. The small flame of Acetylene being equal to 125 standard candles, it follows that this is the ideal light for all purposes. Photometric tests show that a given area of Acetylene flame has

Twelve and One-Half Times the Power of Ordinary Gas.

Five Times the Power of an Incandescent Lamp.

This alone makes the Acetylene light far superior to oil, gas or Edison lamp. Its color is also of the greatest advantage, but there are many other points of superiority.

HYGIENIC ADVANTAGES.

Lack of Heat.

It is difficult to realize the small amount of Acetylene used in producing the wonderfully brilliant light, of which each one-foot flame is equal to six five-foot flames of ordinary gas. The six five-foot flames of ordinary gas use nominally *thirty* cubic feet of gas to give as much light as one flame burning *one* cubic foot of Acetylene; but really the six five-foot burners use over *forty-five* feet of gas as against *one* of Acetylene. Thus it is evident that the amount of heat delivered into a room from Acetylene is less than *one-thirtieth* that of ordinary gas, or about the same as the heat from the bulb of an incandescent lamp. Practically this amounts to nothing in the effect upon the temperature of a room.

Complete Combustion.

The combustion is complete and total, no portion of the gas escaping into the air of the apartment and vitiating it. The importance of this *complete* combustion cannot be overestimated. It makes the difference between sickness and health.

Incomplete combustion causes the formation of *carbon monoxide*, which is always produced when carbon is burned with an insufficient supply of air. Its escape into the room means not only a waste of fuel, but sickness and even death. "Carbon monoxide when respired acts as a violent poison. Even when mixed with a very large quantity of air it produces giddiness and headache, and has in many instances proved fatal. Common coal gas contains from 4 to 7 per cent. of carbon monoxide, and the kind called 'water gas' may contain over 30 per cent. of it." (Youmans' New Chemistry, p. 188.)

Complete combustion, on the other hand, forms *carbon dioxide*, which is always produced when carbon is burned in the presence of plenty of air, and which is the same gas as is exhaled from the lungs of animals in breathing. Every man exhales about 140 gallons of this gas per day.

It is obvious that a flame using only one foot of Acetylene per hour will readily find plenty of air as the gas issues from the small holes of the burner; in proof of this it can be noticed that no blue zone is observable at the base of the flame which extends down fully to the orifice of the burner. Whereas it is equally obvious that five to eight feet rushing through a large burner, as common gas does, cannot possibly find enough air to burn completely.

Fresh Air Retained.

It is apparent from the above observations that in rooms where Acetylene is used there will be not only *no overheating*, but also that the products of combustion will not be noxious, as the quantity of carbon dioxide and water vapor produced is remarkably small, owing to the very small amount of gas used.

One five-foot burner of ordinary gas produces an amount of carbon dioxide that equals the exhalations of about *eighteen* adults; while Acetylene products, with the same illuminating power, equal the exhalations of but *three* adults only.

No Odor.

There is positively no odor from the gas while burning, the flame being clear, white and steady, without smoke and with but little heat.

Perfect Safety.

Acetylene is safer to use than any other artificial light. This is absolutely true as regards the *nature* of the gas itself, the *quantity* used, and also the *generator*.

Although Acetylene will asphyxiate the same as ordinary gas, it is *less* dangerous because its distinctive odor gives immediate notice of its presence. Unlike coal gas which is somnific, or water gas which is without odor (hence difficult to detect and exceedingly dangerous), Acetylene has a pungent, penetrating smell, constituting a safeguard which is unique and very effective against leakage and ignition. When mixed with air there is the same danger as with ordinary gas, but the odor gives notice long before the dangerous proportions are reached.

The largest Acetylene burner passes but one cubic foot per hour. The ordinary city gas jet passes not less than five feet in the same time. If therefore, a burner should be left open and unlighted, only one-fifth as much gas would escape, and the danger consequent from this cause alone is only one-fifth as great as that from using other gas.

The "Monitor" Automatic Generator is almost as safe as a pail of water. An accident cannot happen except by sticking a light into it immediately upon opening, and even then would not be very serious, because of the small amount of gas in it. Less care is required in its use than with any oil light. Under no conditions would it be possible to exert a pressure sufficient to cause an explosion. The only rule necessary to be observed for perfect safety is, not to bring fire near the generator when filling.

Special Note.

If five pounds of calcic carbide should be turned into Acetylene gas it would make about twenty-five cubic feet. If all of this were confined in a small room it would *not* make an explosive mixture with the air, but to do so would have to be confined with the air, in a closet nine or ten feet high and about five feet square, a condition of things which could not possibly happen unless purposely done. As the largest generators which can conveniently be placed in a basement or hall do not hold at any one time more than ten cubic feet of gas, their safety is evident.

ECONOMIC ADVANTAGES.

Cost.

At the present writing, the cost of the Acetylene light is much less per candle power than ordinary gas light. At fifteen cents per pound for carbide, the gas costs three cents per cubic foot. But each cubic foot gives as much light per hour as thirty feet of the very best city gas, which at $2 per thousand would cost six cents, and at $1.25 per thousand nearly four cents, for the same amount of light of poorer quality.

The price of carbide in quantities will soon be not over ten cents per pound It is evident, therefore, that a more economical product is practically now offered, as well as one incomparably superior to common gas in every other respect.

Cleanliness.

The combustion being perfect, there is no smoke or smell whatever. But even if the smoke were the same as common gas, so little Acetylene is used that there would be only one-thirtieth as much as with the latter.

Fresco, wall paper, pictures, curtains and furniture retain their freshness.

Water is the only liquid used in the production of Acetylene, therefore no dirt attends the preparation of the gas.

Manipulation.

By reading the description of the "Monitor" Automatic Generators it will be seen how easy it is to generate the gas. No trouble is ever liable to be experienced.

Color.

The absolute whiteness of the light shows colors in their true nature and shades in their true relation. Consequently it can be used in painting or any work requiring colors and shades to be shown as in daylight. Work can be done at night which ordinarily must be put off until day. This fact alone makes it invaluable.

For surgical and dental uses it shows the tissues as they really are, and prevents mistakes in night examinations. The same is true in regard to microscopic examinations.

For showing paintings, flowers, dry goods, carpets, etc., and any objects of delicate tints and shades, Acetylene may safely be said to be the *only* artificial light by which this truly can be done.

Coolness.

The small amount of gas used causes no more heat to be emitted than that given off by the bulb of an incandescent lamp. It is difficult to realize that seventy half-foot burners use only thirty-five feet of Acetylene per hour, yet give light equal to one thousand cubic feet of common gas, with a consequent lack of heat. In other words, this great light is produced with a consumption of no more gas than is used in four or five city gas jets.

This lack of heat enables the light to be placed near the work, or by Surgeons and Dentists near the patient, without any inconvenience. For hospital or sick-room use this coolness is especially appreciated. This more than doubly increases the value of the light, because, by bringing it close, the work has far greater illumination.

Steadiness.

The burners are so small that great variations in pressure, if they ever occur, are not noticed in the flame. The light burns, therefore, with more perfect steadiness than any other artificial light.

Uniformity.

Scientists the world over have approved Acetylene as a standard, because its light is always the same, not only in intensity, but also in quality. The work done with this light as an illuminant at one time will be the same as at another; in other words, it can be depended upon at all times to be the same. This light will undoubtedly become the standard unit for photometric measurements, displacing the old uncertain candle power.

Actinism.

The chemical rays of this light are such as to adapt it readily to photography, both as regards the exposure of the negatives and the printing from them. It is already in use in one large gallery in Chicago most successfully, and has completely displaced both the arc light and solar lantern for the making of enlargements.

ACETYLENE.

What is it?

Acetylene is a pure hydro–carbon gas chemically described as C_2H_2.

Properties.

It is clear, colorless and heavy, with a distinctive odor, burning with a flame of intense brilliancy. It is a vital principle of ordinary gas although present only to the extent of from ½ to 1½ per cent.

Distribution.

It may be handled and distributed in much the same manner as ordinary gas or by means much less complex.

Elements.

The elements employed are of the simplest character, being ground coke, lime, water and electricity.

Calcic Carbide.

Pure, unslacked lime and high-grade coke, both finely ground and intimately mixed, are submitted to the intense heat of the electric furnace under which they fuse down into a dark, crystalline, semi-metallic mass, known as Calcic Carbide or Carbide of Calcium. *The most intense heat has no further effect upon this material,* but it has so great affinity for water or moisture in any form, that it cannot be exposed to the atmosphere for any length of time without loss from decomposition. It is therefore sold in air-tight cases only, in which it should be kept until needed for the actual manufacture of the gas.

Generation of Acetylene.

The actual generation is produced in an astonishingly simple manner. In a suitably arranged generator, the calcic carbide is brought into contact with water. A sort of double decomposition takes place. The oxygen of the water unites with the calcium of the calcic carbide, forming oxide of calcium which is precipitated to the bottom of the generator. The hydrogen of the water unites with the carbon of the calcic carbide forming Acetylene which rises and is used.

CaC_2	+	H_2O	=	CaO	+	C_2H_2
Calcic Carbide.		Water		Calcium Oxide.		Acetylene.

THE APPARATUS.

THE FULLER "MONITOR" AUTOMATIC ACETYLENE GENERATOR.

Patented.

This Generator consists of two cylinders, one within the other, of peculiar shape. The Tank, or outer cylinder, has a recessed bottom (except in the smallest sizes), which saves weight of water and acts as a receptacle for the residue. In the larger sizes the residue can be drawn off from the bottom through a convenient opening. The Gasometer, or inner cylinder, is free to move within the Tank, and in the top carries the loading device for carbide, which is introduced in the smaller sizes through a clamp or screw-cap; in the middle sizes a water seal is preferably used, and in the largest sizes a special gas-tight trap. A suitable outlet is provided for the gas. The peculiar shape of the top of the Gasometer compensates, by less displacement of water, for the consumption of carbide and consequent loss of weight; thus helping to keep the pressure constant at the burners.

The Purifier and Condenser.

The Purifier consists of a double cylinder, one within the other; the inner one is provided with compartments which also act as condensers. The large Purifier is a coil of pipe in a water chamber with an enlargement for holding residue.

The Burner.

All fixtures may be the same for Acetylene as for ordinary gas, except the burner *tips*, which are very small; they fit regular fixtures.

For special purposes special lamps have been devised.

Special Advantages.

FIRST—The pressure does not at any time exceed the weight of the Gasometer and carbide, which per square inch is not over *two ounces*, and which is the same as city gas.

SECOND—There are no valves of any kind to get out of order.

THIRD—The Apparatus is safer to manage than ordinary lamps.

Full Directions Sent With Each Generator.

ADVANTAGES.

FIRST, GENERATION—The gas is not generated in our apparatus to a greater extent than used, thus preventing an accumulation and rendering a large gasometer unnecessary.

SECOND, STEADY GENERATION—The generation of gas is more steady than can be obtained in any other way.

THIRD, EVEN PRESSURE—The pressure practically remains constant.

FOURTH, ADJUSTABLE PRESSURE—The pressure can be adjusted within certain limits to that best adapted to the purpose and number of burners.

FIFTH, SIZE AND WEIGHT—The apparatus is compact and equal to a gasometer twenty times the size. It is extremely light in weight.

SIXTH, DRY AND COOL—The gas is dried first in the Generator and secondly in the Purifier so as to be delivered to the burners dry, clean, pure and cool.

SEVENTH, SIMPLICITY—The apparatus is extremely simple and requires no particular skill in manipulation.

EIGHTH, MATERIAL—The apparatus is strongly made of those materials best suited to each part, and although light it is very strong.

NINTH, APPEARANCE—The appearance is handsome rather than otherwise.

TENTH, PORTABILITY—The size and weight being so small, the apparatus is easily carried about.

ELEVENTH, EASY MANIPULATION—By reading the Directions it will be seen that the manipulation is simple, easy and not liable to cause any trouble.

TWELFTH, DURABILITY—The simplicity and strength of the apparatus renders it very durable, it cannot get out of order.

MODE OF OPERATION.

Calcic Carbide is placed in the Generator and the stopcock opened as per Directions. As the air or gas escapes, the water rises until it comes in contact with the Calcic Carbide. Acetylene is at once generated and passing around the Calcic Carbide, is dried and the dampness absorbed produces more gas which rises into the upper part of the Generator. The Carbide in the annular space around the holder still further dries the gas. If more gas is generated than is used at once, the pressure of the gas forces the water away from the Calcic Carbide and generation almost ceases, continuing slightly owing to the water held by capillary attraction and as vapor. When the pressure reaches a certain limit the Generator rises so as to store under uniform pressure the gas produced. As the gas is used, the Generator descends and the operation is repeated.

PRACTICAL APPLICATIONS.

GENERAL LIGHTING.

Houses, Halls, Churches, Theaters, Hotels, Lawns, Gardens, Etc.

The beautiful Acetylene light can now be used for domestic and public purposes. The apparatus should be selected to light the largest size and number of burners ever required at once for the longest continuous time. In other words it must supply the required number of cubic feet of Acetylene per hour, for a given number of hours continuously, before recharging. A larger apparatus should be selected if it is desired to recharge at long intervals. It is better to consult us, however, giving the number and size of burners, the longest time they are to burn continuously and whether the Generator is to be charged daily or weekly; we should know also the *height* of the room in which the Generator is to be placed, and the width of entrance to the room.

Generator.

Like the boiler of a steam-engine, it is always better to select a Generator of ample capacity. We can advise carefully whenever furnished with the information asked for above.

Piping and Fixtures.

The piping and fixtures may be the same as for ordinary gas; but if intended for Acetylene only, the main pipes may be much smaller, as only about one-thirtieth as much Acetylene need be used as ordinary gas.

Burners.

Ordinary gas tips cannot be used. We have devised burners especially adapted for Acetylene; these fit the regular pillars.

Amount of Gas.

Each pound of carbide will generate about five cubic feet of Acetylene, and each cubic foot of Acetylene is equal in lighting power to thirty cubic feet of common gas.

VILLAGES, TOWNS AND CITIES.

At last all the advantages of general city lighting, together with the many special advantages of Acetylene, can be enjoyed by the smallest villages and towns by the use of the "Monitor" Automatic Acetylene Generators. Indeed not only is this possible, but it is done at a far less expense than city gas, both in regard to the first cost of plant and to the cost of the gas.

Generator Plant.

A village which would use 15,000 cubic feet of common gas per day would use only 500 cubic feet of Acetylene; this would be produced by a generator holding one hundred pounds of calcic carbide. An ordinary gas plant would require a *fifty-foot lot* for its furnaces, retorts and gasometer, with a number of attendants. Indeed its expense absolutely forbids putting up a plant of this kind for so small a supply of gas, hence small towns have to do without gas. But *two* of our No. 7 "Monitor" Automatic Generators with condenser can be put in any room nine feet high by nine feet square, with one or two men as attendants.

Two No. 10 "Monitor" Automatic Generators will furnish the equivalent of 150,000 cubic feet of common gas per day (enough for about 1,000 to 2,000 inhabitants), and can be put complete in any room ten to fifteen feet high and fifteen feet square. One or two attendants are sufficient.

For large towns several large generators may be used in batteries.

Piping.

As only one-thirtieth as much Acetylene is used as common gas, it follows that the pipes may be much smaller. Practically a three-inch pipe with convenient tight screw connections will take the place of a heavy cast-iron eight or ten-inch main, with expensive, leaky, calked joints. When the expense of handling, laying and maintaining these large pipes is considered, it is evident that these items of first cost and maintenance are so greatly reduced as to be practicable in small places as well as large.

Indeed if the houses or other points of consumption are very much scattered, it is not necessary to carry the gas long distances in pipes, but only to distribute generators of desired size in rooms near the places of greatest consumption, using short pipes. In this case the number of attendants need not be increased, as one man can attend to several generator stations.

SPECIAL LIGHTING.

Single Rooms, Reading Lamps, Microscopes, Stereopticons, Photograph Galleries, Etc.

The generator for these purposes is one of the smaller sizes, as mentioned under the description of each generator, but the burners are different.

The stand or bracket for single rooms or reading lamps may be at the taste and means of the purchaser, and the burner tip either ½-foot or 1-foot or a cluster of these, with or without shades. For microscopic use a burner using less than ⅛-foot of Acetylene per hour has been devised, which concentrates the light to a brilliant point. The stereopticon burner is especially constructed so as to be readily adjustable. This produces an effect upon the screen which is equalled only by the electric arc or oxy-hydrogen light; but is, of course, much less expensive to maintain and less trouble to handle than either of these.

For photographic use in making an exposure, one or more groups of burners on an adjustable stand are used, behind which suitable reflectors may be placed. A light equal to the electric arc in brightness can easily be obtained, while in actinic power it is much greater. The exposure varies from one to ten seconds. For printing from the negative a special lantern is used, on the smallest of which four printing frames may be placed at one time. With suitable paper a print may be made in a few seconds. For enlargements a burner similar to a stereopticon burner is used in a suitable camera.

Boats, Railway and Street Cars, Elevators, Etc.

Generators for these purposes are made to withstand the various motions and jars to which they are subjected, as described later. For small boats and carriages a modification of the smaller sizes enables them to be used as they are, but for larger boats a double swing frame to compensate for the roll and pitch is necessary. For still larger boats a swing for the roll is enough, and for very large ones both swings can be dispensed with.

For cars and elevators the generator is either tall and narrow for placing in a corner, or broad and short for placing under the car or elevator.

A burner which does not *blow* with the varying conditions is supplied for these purposes.

Table and Ornamental Lamps.

The "Monitor" Generator, No. 1, is made of various dimensions to take the place of the ordinary kerosene lamp in many cases, as a lamp for the table or to be placed with fancy shades in suitable vases for ornamental purposes, as hall or corner lights, piano lamps, etc. By sending us dimensions of founts and shades, we can in almost every case fit this generator to the ornamental parts. It can also be used as a hand lamp.

Light Houses, Signal Stations and Buoys.

The generators for this purpose are designed to furnish gas for a long time with perfect reliability and lack of watching. We solicit correspondence particularly in regard to these uses for which Acetylene is especially adapted owing to its whiteness, great penetrating power and coolness, thus avoiding the danger of breaking lenses and shades.

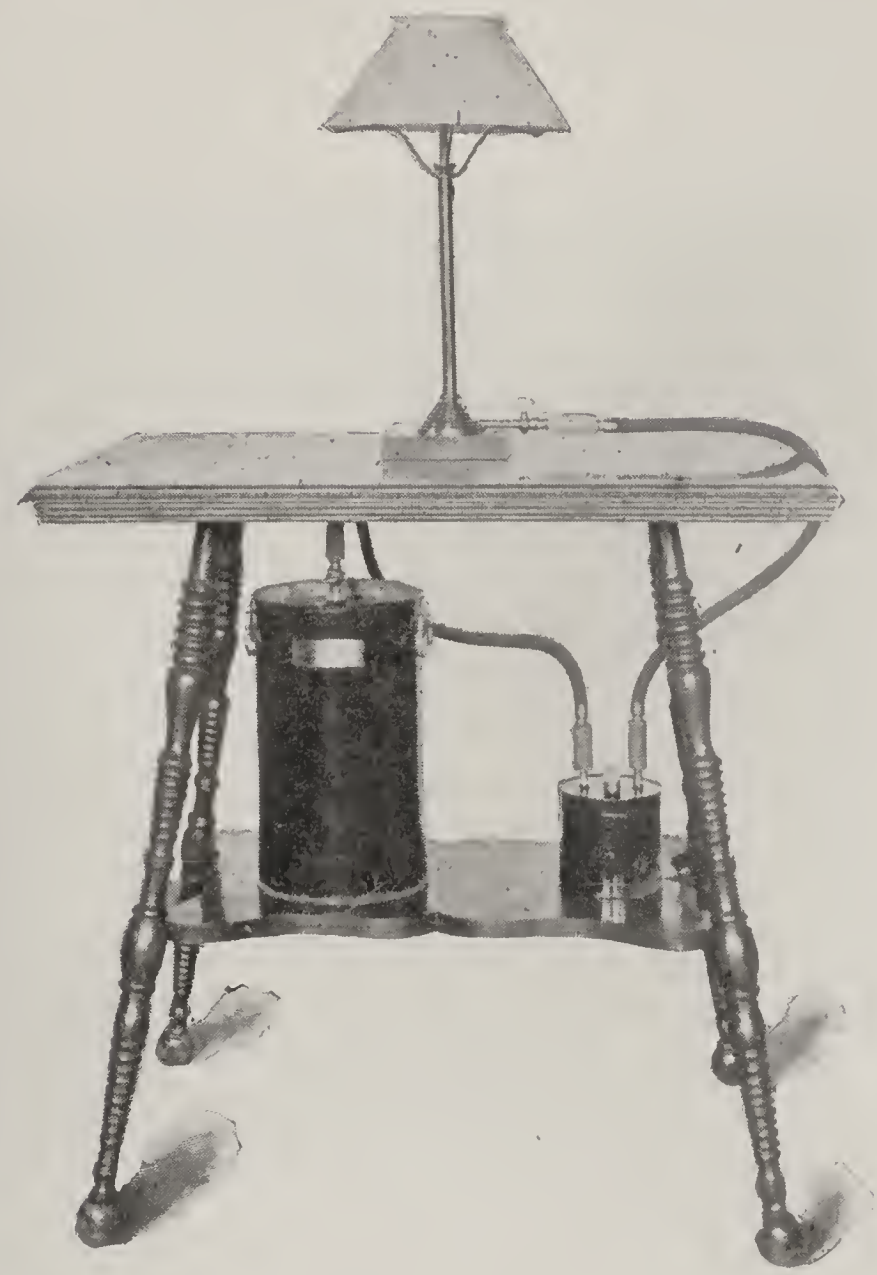
SPECIAL NOTICE.

The "Monitor" Automatic Acetylene Generators have been designed for all purposes, using from one of the smallest tips, burning for a short time only, to any number of regular tips burning steadily or intermittently for a long time; and although better suited for the special purpose for which it is intended, each generator can be used for a great variety of work.

For example, the Generator No. 3 can be used for the Stereopticon with the Quadruple Burner for several hours. The gas space is sufficient to allow the gas to be turned entirely off for a day or more. It is evident that the four burners can be used in as many rooms by proper connections, or that one burner only can be used for about four times as long.

When great portability is desired, Generator No. 1 or 2 must be used, although No. 3 can be carried about without much inconvenience. The larger generators are not intended to be moved often.

We recommend the Generator No. 3 as best adapted for a great variety of work with a small number of burners.



Generator No. 1, Purifier and Reading Lamp.

This Lamp is usually fitted with one half-foot burner which gives as much light as two ordinary gas jets.

Half a pound of calcic carbide will last this lamp for five hours, of course longer if turned down slightly. Two such burners can be used with this Generator, if desired, on one or two standards. A one-foot burner may be used when more light is necessary.

This Generator is usually 8 inches high and 6 inches in diameter, but is made in a great many shapes to suit various ornamental fittings. In several styles the generator forms the base of the lamp, and is one with it It can be used as a lamp for the table, piano, etc., for carrying as a hand lamp, for carriages, and wherever a small, portable or ornamental lamp is wanted.

This Generator is usually filled from the under part of the inner shell. (See page 16.) Illustrated circular of the several forms is in preparation.

Price, Generator No. 1, ... **$15.00**
Price with Lamp..... **20.00**

Discount.....

Generator No. 2, with Purifier, Reading and Microscope Lamp.

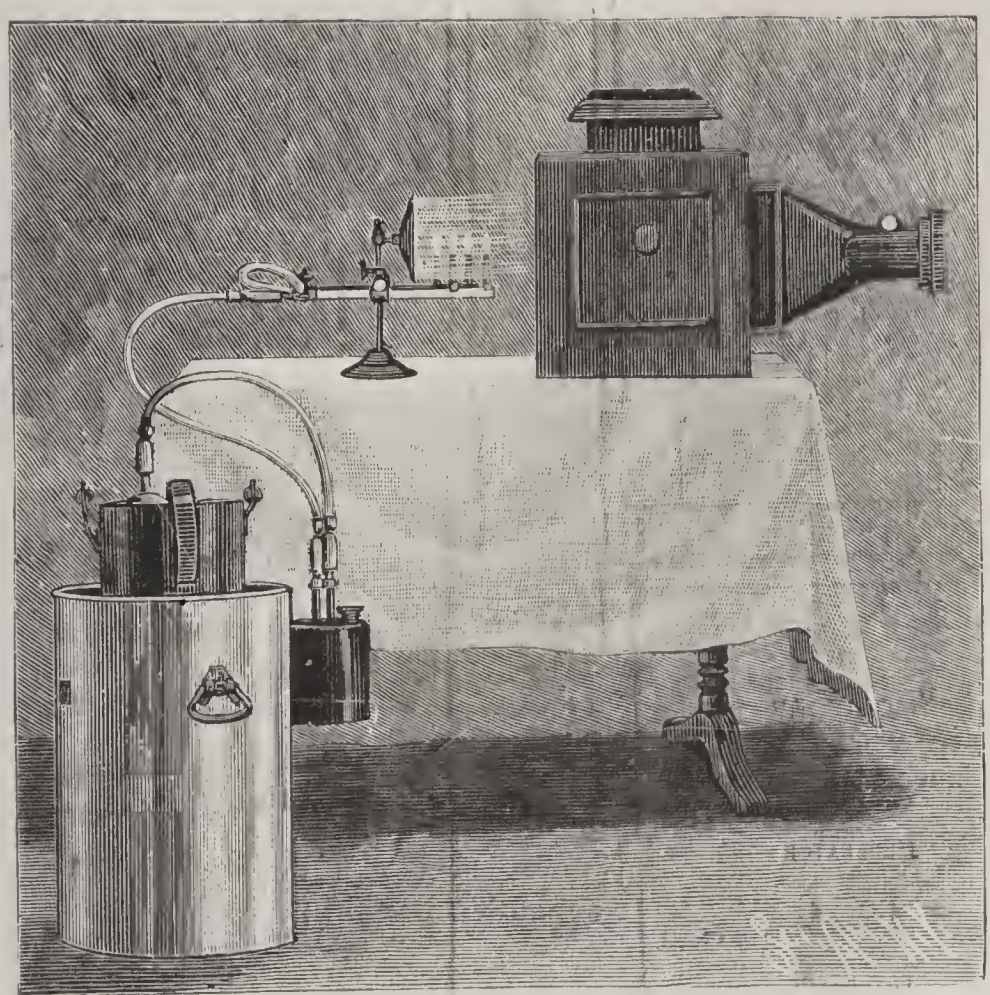
Height, down, 15 inches; when fully up, 24 inches; diameter, 8 inches. One pound of carbide in this generator will supply a one-foot burner for five hours, giving a light equal to six five-foot ordinary city gas jets. Two pounds of carbide is the utmost capacity of this generator, and should only be used when two or four one-foot burners are to be supplied *continuously* until the gas is entirely exhausted.

This Generator is easily and quickly filled from the top by a clamp device and is very portable; it is intended to generate the gas for immediate and continuous use, and not to store the gas to any extent, although it may be turned down or off for a short time.

It is especially adapted for Reading and Piano Lamps, long microscopic manipulations, small stereopticons, etc.

Price of Generator alone, with Purifier and Connections..... $18.00
Price, with either Reading or Microscope Lamp..... 23.00

Discount.....



Generator No. 3, Purifier, Peerless Sciopticon, and No. 5 Burner.

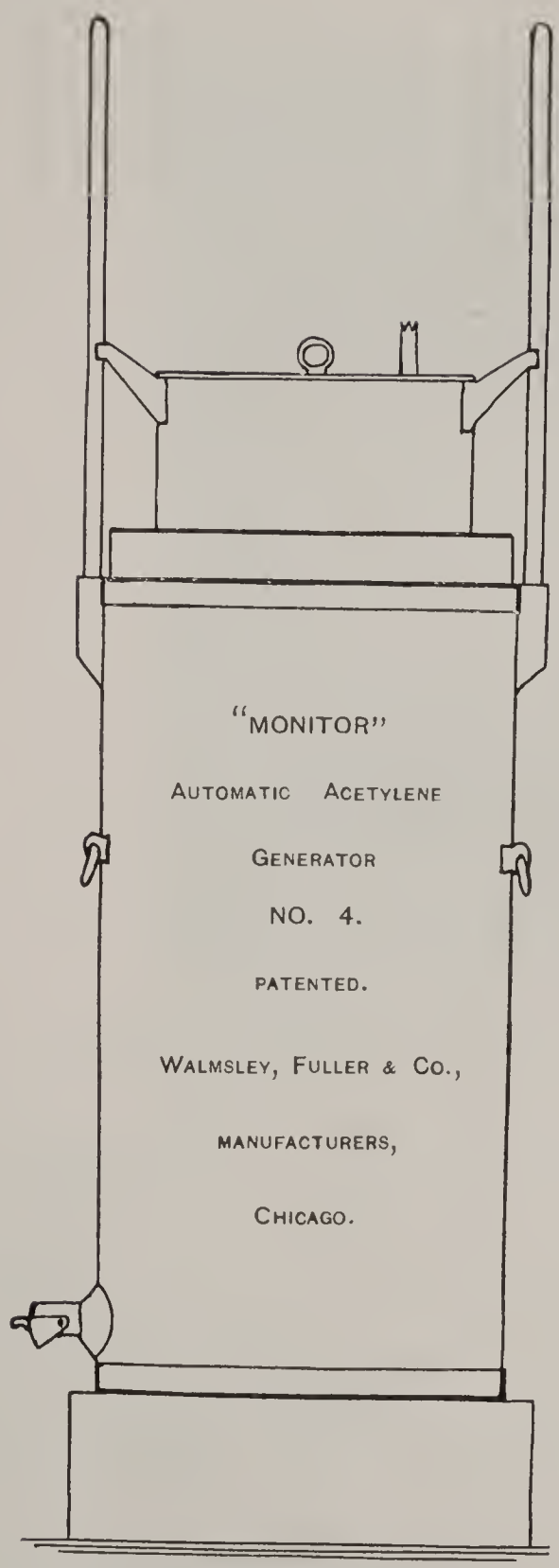
Height, down, 18 inches; when fully up, 30 inches; diameter, 12 inches. Two pounds of carbide in this generator will supply two one-foot burners for five hours, giving a light equal to twelve ordinary five-foot city gas jets. If loaded with two pounds, this generator has gas room enough for intermittent use, with intervals of rest when the gas is turned down or off. Five pounds of carbide is the utmost capacity of this generator, and should only be used when six or eight one-foot burners are to be supplied *continuously* until the gas is entirely exhausted.

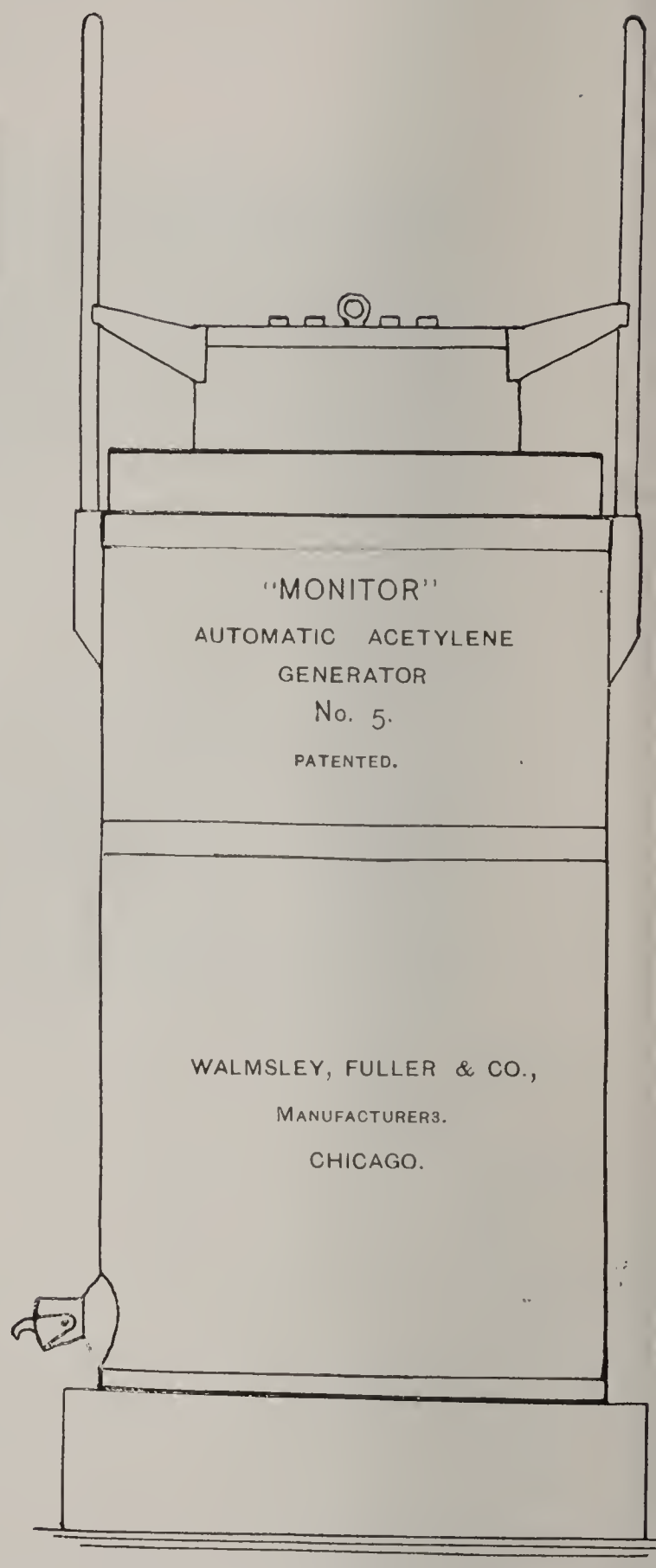
This Generator is filled very easily through a water seal, giving an absolutely gas-tight joint. A clamp or screw top will be furnished to order at a slight extra charge.

It is especially adapted for lighting single rooms, for projection, photomicrography, photographic printing and enlargements, and whenever four one-foot burners or equivalent are required for six hours' use, or one burner for twenty-four hours' use. (See pages 4 and 16.)

Price of Generator alone, with Purifier and Connections..... $30.00
Price, with Burner No. 5 and Peerless Sciopticon... .... 90.00

Discount.....





The above cuts represent respectively Generators Nos. 4 and 5 as re
larly constructed. For special purposes, when necessary, they are m
shorter, but larger in diameter.

For house-lighting these are the smallest sizes that can well be us
Generator No. 4 is regularly fitted with the water-seal top, and No
with screw top. At a slight extra cost these fittings can be interchange

Both of these generators have recessed bottom, holding a pan for
residue. When the space in which these generators are to be placed is
the pan is omitted and a modification of the bottom enables all the resi
to pass through the stop-cock.

GENERATOR NO. 4.

Height, down, 34 inches; when fully up, 5 feet; diameter, 20 inches.

Full charge of carbide for *continuous use*, 10 pounds. This will supply ive cubic feet of Acetylene per hour for ten hours, giving light equal to hirty city gas jets. In other words this will supply twenty half-foot burn-rs for five hours, and give the same amount of light as sixty five-foot city as jets, but of better quality and with less heat. For intermittent use it is etter to fill this size generator more frequently with five pounds each time.

This generator is especially adapted for lighting small halls, meeting-ooms, photograph galleries, chapels, lodges, lawns, etc.

Price, with Purifier, Connections and Guides **$60.00**
Price, with Purifier, Connections, Guides, Counterpoise, Pulleys and Cord . **90.00**

Discount.... ...

GENERATOR NO. 5.

Height, down, 4 feet; when fully up, 7 feet; diameter, 2½ feet.

Full charge of carbide for *continuous use*, 25 pounds.

For intermittent use, it is better to put in only about 15 pounds.

This generator is especially adapted for twelve-room houses, small churches, hotels, theaters, halls, light-houses, suburban railway stations, etc.

Price, with Purifier, Connections and Guides **150.00**
Price, with Purifier, Connections, Guides, Counterpoise, Pulleys and Cord . **180.00**
Price, with Purifier, Connections, Guides, Counterpoise, Pulleys and Cord, Extra Heavy and with Water and Gas Pressure Gauges.... ..... **240.00**

Discount.....

GENERATOR NO. 6.

Height, down, 4 feet; when fully up, 8 feet; diameter, 3 feet.

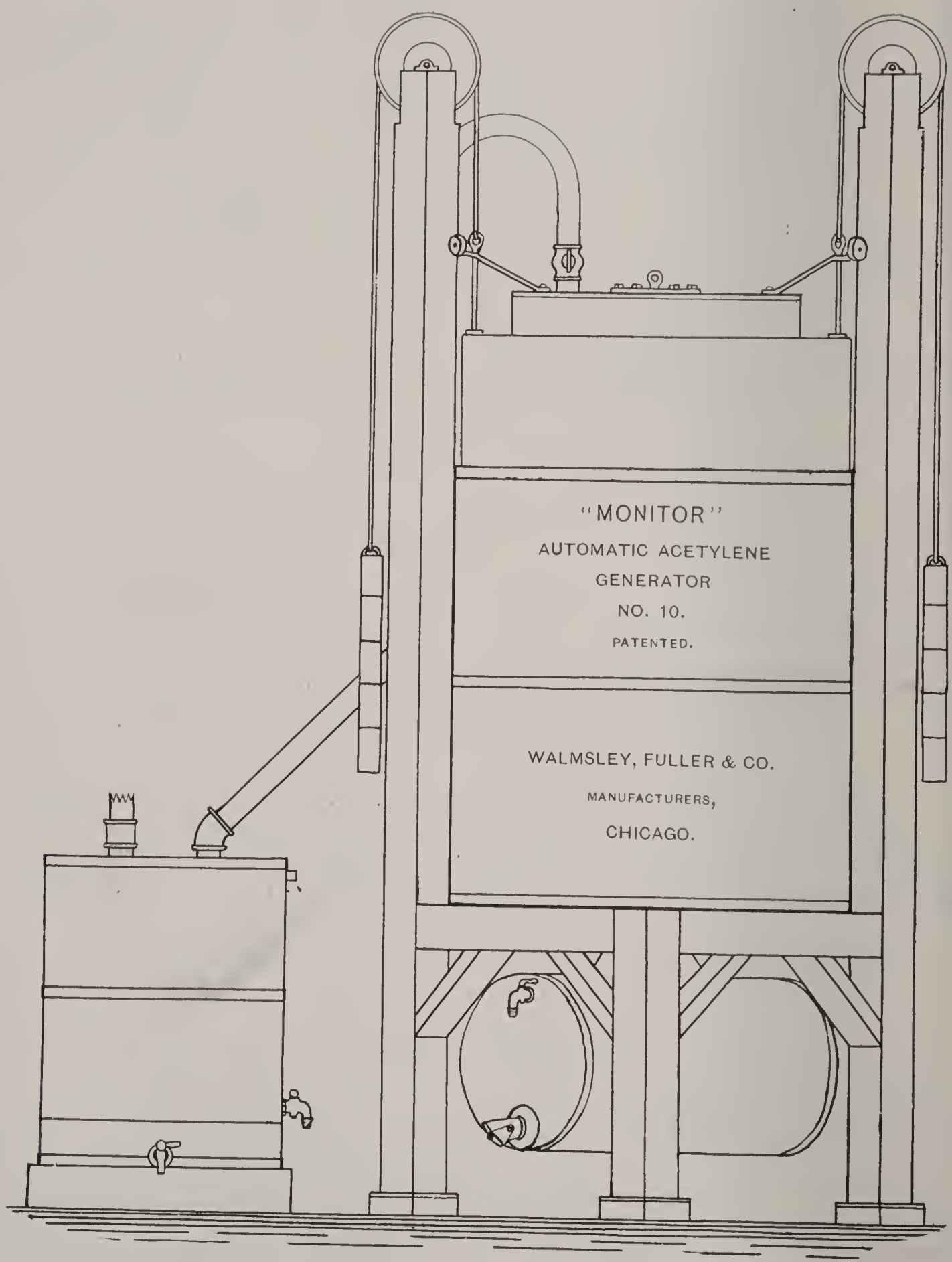
Full charge of carbide for *continuous use*, 50 pounds.

For intermittent use, it is better to put in only about 30 pounds.

This generator is especially adapted for twenty-room houses, churches, theaters, halls, railway depots, etc.

Price, with Purifier, Connections, Guides, Counterpoise, Pulleys and Cord, Water and Pressure Gauges.... .. .. **270.00**

Discount.....



"MONITOR" Automatic Acetylene Generator No. 10.

GENERATOR NO. 7.

Height over Guides, 9 feet; diameter, 3½ feet.

Full charge of carbide for *continuous use*, 100 pounds.

Charge for intermittent use, about 60 pounds.

This generator is especially adapted for large houses, railway depots, hotels, etc. If two are used, this size will do for villages or town districts.

Price, Complete.....$300.00

Discount.... ...

GENERATOR NO. 8.

Height over Guides, 9 feet; diameter, 4 feet.

Full charge of carbide for *continuous use*, 200 pounds.

Charge for intermittent use, about 125 pounds.

This generator is especially adapted for very large houses, hotels, theaters, depots, etc., and in batteries of two or more for lighting villages and towns.

Price, Complete. 360.00

Discount.....

GENERATOR NO. 9.

Height over Guides, 10 feet; diameter, 4½ feet.

Full charge of carbide for *continuous use*, 300 pounds.

Charge for intermittent use, about 200 pounds.

This generator is adapted to the same purposes as No. 8, but requires to be filled less frequently.

Price, Complete 420.00

Discount.....

GENERATOR NO. 10.

Height over wooden frame, 14 feet. Outside diameter of frame work, 6 feet.

Full charge of carbide for *continuous use*, 300 pounds.

Charge for intermittent use, 200 pounds.

This generator is especially adapted for lighting country houses where a large number of 1-foot burners, say 100, are used continuously for two hours, or 50 burners for four hours, in which case the generator will require 300 pounds of carbide once a week.

Price, Complete..... .... 600.00

Discount.....

GENERATORS FOR USING 500 LBS., 1,000 LBS., 1,500 LBS., AND LARGER AMOUNTS OF CARBIDE, MADE TO ORDER.

SPECIAL GENERATORS.

YACHT GENERATOR, NO. 20.

Height down, 18 inches; when fully up, 24 inches; diameter, 12 inches.
Full charge of carbide for *continuous use*, 5 pounds.
Charge for intermittent use, 2 pounds.
On stand to compensate for roll and pitch.

This generator is intended to be placed under the deck at the stern, or similar out-of-the-way place in small boats. It can be filled and emptied conveniently. It will light side lights and cabin.

Price, with Purifier, Stand, Water Gauge and Connections $45.00

Discount.....

YACHT GENERATOR, NO. 21.

Height, down, 24 inches; when fully up, 36 inches; diameter, 18 inches.
Full charge of carbide for *continuous use*, 10 pounds.
Charge for intermittent use, 5 pounds.
On stand to compensate for roll.

This generator is intended to be placed similarly to No. 20. It will light side lights, head light and cabin.

Price 75.00

Discount.....

NOTE.

For large boats one of our regular generators may be used, slightly increased in diameter and lowered in height, with one or two minor changes.

Prices on application.

ELEVATOR GENERATOR, NO. 30.

Height, down, 3 feet; when fully up, 5 feet; diameter, 9 inches.

Full charge of carbide for *continuous use*, 5 pounds.

This charge will last one one-foot burner for 25 hours, continuous use. For all ordinary purposes a charge of two pounds of carbide and a smaller burner will last for one day. Several small burners may be placed around the sides of the elevator, thus producing a very pleasing effect.

The generator is to be placed in the corner.

Price, with Purifier, Connections and Center Lamp..... **$60.00**
Price, without Lamp..... **45.00**

Discount.....

SPECIAL NOTE.

The regular No. 2 or 3 generator may be used for elevators by slightly increasing its height.

Prices on application.

CARRIAGE GENERATOR, NO. 40.

Height, 18 inches; diameter, 6 inches.

Full charge of carbide for *continuous use*, one pound.

This will run two side lights and one inside light for 4 hours continuously. It requires our special burner, which will not blow. A modified form of Purifier is used with it.

Prices on application.

Discount.....

PRICE LIST OF SPECIAL FIXTURES.

Search Light, deep parabolic reflector, 10 inches diameter on adjustable stand, - - - - - - - - - - 45.00

Search Light, same as above, 14 inches diameter - - - 75.00

For use on yachts and steamers, these lights can be moved horizontally and vertically from the under side of the deck, if so ordered.

Entrance Lights, a cluster of burners on ornamental brackets with shade, for outdoor use. Prices on application

Lamp-Posts, with one burner or a cluster. Prices on application.

Discount.....

PRICE LIST OF LAMPS, BRACKETS, ETC.

Table Lamp, with Shade and Holder (see cut, page 18), - - $6.00
Table Lamp, elevating, with Shade and Holder, - - - - 8.00
Microscope Lamp, adjustable (see cut, page 18), - - - - 4.50
Brackets, bronze or gilt, straight or curved, stiff, - - - - .60

Brackets,	1	2	3	Universal, Double,	Joints. Triple.	
Price,	.75	1.20	1.50	1.50	1.80	each.

The above in polished brass, 50 per cent. extra.

Pendants, - - - - single, 1.00 and 2.00; double, 2.70 and 5.00
Side Bracket, adjustable up and down and sidewise, for Dentists, Oculists and Surgeons, without shade, - - iron, 7.50; brass, 12 00
Car or Elevator Lamps, - - - - - - 15.00, 30 00 and 45.00
Carriage Lamp for interior, with shade, - - - - - - 6.00
Carriage Lamp for exterior, per pair, - - - - - - - 15.00
Close Clusters, extra strong, lacquered, nickeled or oxydized, without shade or tips,

For	2	3	4	6	8	tips.
Price,	2.00	2.50	3.00	4.00	6.00	each.

If furnished with an extra elevated connection for a central tip, 1.00 additional.

Globe Holders, per dozen, - - - - 4-inch, 1.80; 5-inch, 3.00
Bracket Backs, per dozen, - - - - - 2½-inch, .75; 3-inch, 1.00
Burner Cups, per dozen, - - - - - - - - - - .30
Shadowless Holders, per dozen, - - - - - - - - 2.40
Shade, white glass (see cut, page 18), - - - - - - .60
Globe, white or clear glass, - - - - - - - - 1.00

Discount.....

PRICE LIST OF BRASS STOP-COCKS.

Size,	⅛	¼	⅜	½	¾	1	inch.
Gas Service Cocks,							
Flathead,		.60	.75	.90	1.20	1.60	each.
Finished Cocks,							
T or Lever Handle,	.90	1.00	1.20	1.50			each.
Pillar Cocks,	.45	.50	.60	.75	.90		each.
Hose Cocks,	.50	.60	.75				each.
Independent,	.60	.75	.90				each
Double Pendant,		.90	1.00	with ⅛ or ¼ side outlet.			
Elbow Cocks,	.45	.50	.60	.75			each.
Universal Cocks,			1.20	with ⅛, ¼ or ⅜ side outlet.			

Discount .....

PRICE LIST OF MISCELLANEOUS PARTS.

Tips, with Pillars, in small lots, per dozen, 2.00; per full gross, - $18.00

Pillars, per dozen, .60; per full gross, - - - - - - 5.00

Cloth Covered Hose, with patent ends, in lengths from 2 feet upwards, per foot, - - - - - - - - - - - - .25

White Rubber Hose,

Size,	1/8	3/16	1/4	3/8	1/2	5/8 inch.
Price,	.08	.12	.18	.25	.30	.40 per foot.

Brass T's and Y's, for hose connections,

Size,	1/8	1/4	3/8	1/2 inch.
Price,	.25	.30	.45	.75 each.

Gas Pressure Gauge, simple 3.00; with screw connections, - - 10.00

Gas Pipe Fittings,

Size,	1/8	1/4	3/8	1/2	3/4	1 inch.
Close Nipples,	.05	.05	.06	.07	.09	.10 each.
Long "	.07	.07	.09	.10	.11	.15 "
Couplings,	.05	.05	.06	.07	.10	.13 "
R. & L. Couplings,		.05	.08	.10	.15	.18 "
Elbows,	.05	.05	.07	.12	.18	.25 "
Drop Elbows,		.07	.10	.15	.25	.30 "
Side Elbows,			.10	.12	.20	.36 "
45° Elbows,			.12	.15	.20	.30 "
T's,	.08	.08	.10	.12	.18	.27 "
Four-way Tip,			.15	.18	.25	.40 "
Drop T's,		.10	.12	.16	.27	.36 "
Crosses,		.10	.12	.16	.27	.35 "
Reducers,		.05	.05	.08	.12	.18 "
Caps,	.05	.05	.06	.08	.10	.15 "
Plugs,	.05	.05	.06	.08	.10	.15 "
Bushings,			.06	.08	.10	.15 "
Unions,		.18	.21	.27	.36	.45 "

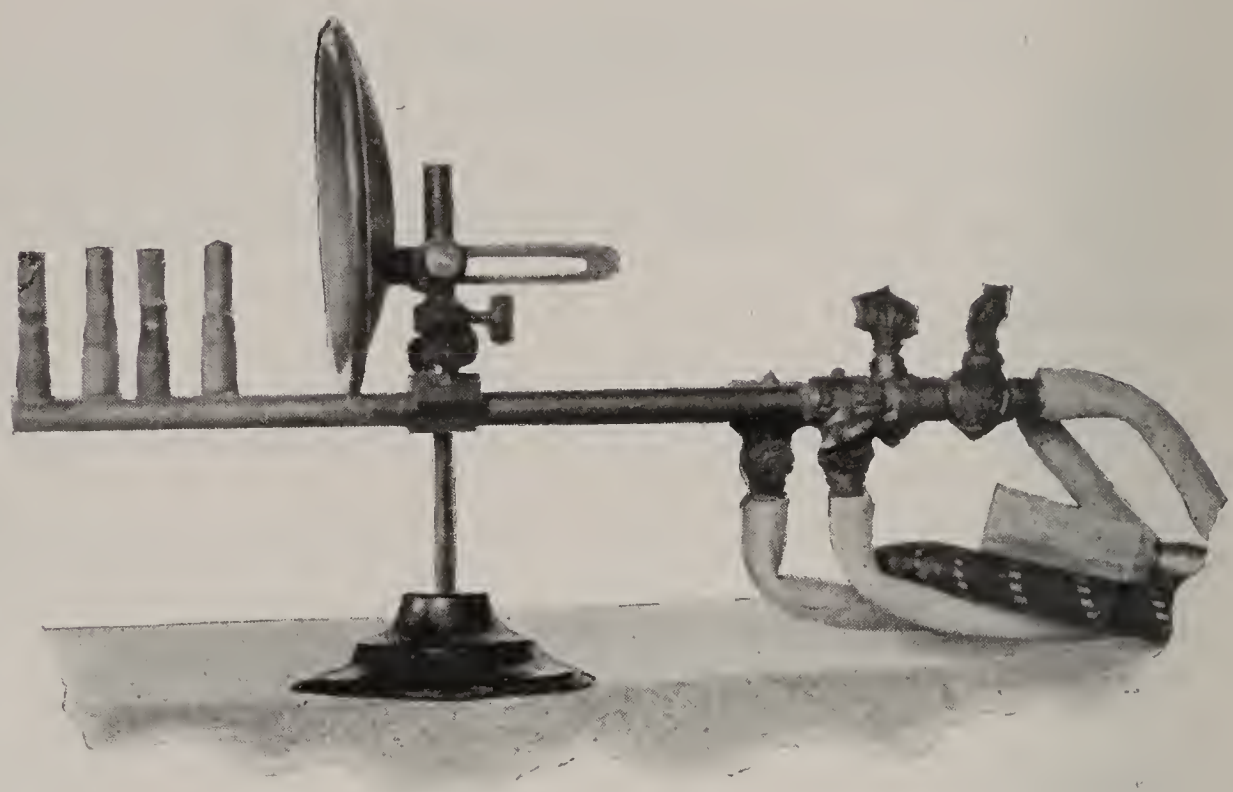
Taper Holder, - - - - - - - - - - - - 1.00

Wall Plates, 3/8-inch, iron, - - - - - - - - .15

Iron Gas Pipe,

Size,	1/8	1/4	3/8	1/2	3/4	1 inch.
Price,	.05	.06	.06	.07	.09	.12 per foot.

Discount.....



Sciopticon Quadruple Burner, No. 6.

1. **Single Burner,** with one-foot tip, giving a light of about 125 candle power, intended to take the place of the oil lamp in projection lanterns, to which it is much superior. With stopcock, adjustable Stand and Parabolic Mirror, - - - - $6.00

For use with the Microscope and small Sciopticon; also in photographic dark room, work room, etc.

Generator No. 2 is well adapted for this burner when portability is necessary.

2. **Double Burner,** same as No. 1, but with two tips, - - - 7.00
3. **Double Burner,** same as No. 2, but with stopcock for each tip, with Y tube, - - - - - - - - - - 9.00
4. **Double Burner,** each tip on separate adjustable stem, with Y tube and two stopcocks, adjustable Stand and Parabolic Mirror, - 10.50

One burner can be used alone if desired.

5. **Quadruple Burner,** same as No. 4, but each stem has two tips, - 12.00
6. **Quadruple Burner,** same as No. 5, but with four stopcocks, - 15.00

NOTE.—This is the best burner for large pictures. Generator No. 3 should be used with it.

Discount.....

The cost of running a pair of Optical Lanterns with dissolving key and quadruple burner at present prices of Calcic Carbide is about twelve cents per hour. A single lantern with double burner costs not over five cents per hour for the Acetylene consumed. It will thus be seen that not only is this the *best* light for the purpose, but the *cheapest* also.

PRICE LIST OF STEREOPTICONS.

1. **Manhattan Lantern,** especially adapted for Parlors and small Halls; will produce a perfectly defined picture 8 feet in diameter. Consists of Burner No. 2, improved condensers 4 inches in diameter, and a superior ¼ size objective mounted in brass with rack and pinion for adjustment of focus; in wooden carrying case, - - - - - - - - - - 50.00

2. **Peerless Sciopticon,** adapted for Public Entertainments, Army Posts, Societies, Sunday School, etc., made of Russia sheet iron with double body, the outer one being perforated to avoid heating; extension front with nickel-plated hood; spring clip for holding carrier with slide; Quadruple Burner No. 5; gives a uniform 10-foot sharp-cut picture at a distance of 18 feet from the screen; has fine achromatic objective, with rack and pinion adjustment for focus; a pair of 4-inch condensing lenses, mounted in brass, adjusted to expansion and contraction, packed in a neat Russia sheet-iron case (with lock), which can be used as a stand for the lantern. Complete, - - 60.00

3. **Monitor Sciopticon,** incomparably the best magic lantern for parlor, lodge or school-room. The skeleton frame, made of light but strong brass castings handsomely nickel plated, permits a very great reduction in bulk. When not in use and when packed in its carrying case it weighs only eight pounds. The condensers are 4½ inches in diameter and of the finest quality, mounted in brass cells with screw collar, rendering them easily removeable. The body is of Russia iron, with side door and internal rods for Quadruple Burner No. 5. It can be rapidly converted into a lime-light lantern at additional expense of jets. The bellows front is provided with a ¼ size achromatic objective with rack and pinion for focusing, and will give a uniformly illuminated field of 12 feet or more in diameter. Packed in a carrying case which can be used as a stand for the lantern, enabling it to be elevated or depressed at any angle to center the disk on the screen; automatic stop for framed views. Complete, - - - - - 90.00

4. **Acme Sciopticon,** similar to No. 6, but more highly finished and with more expensive lenses, - - - - - - 126.00

5. **Premier Projection Lantern,** for large Halls, with ¼ and ½ size Darlot Lenses, Quadruple Burner No. 6, in case, - - 210.00

6. **Pair of Peerless Lanterns,** No. 2, with dissolving key, - - - 126.00

7. **Pair of Monitor Lanterns,** No. 3, with dissolving key, - - 180.00

We can fit any Lantern in the market with our patent Acetylene burners.

Discount.....

Generators will be Required with the Above.

PRICE LIST OF COMPLETE OUTFITS.

1.	Lantern	No. 1	with Generator	No. 2,	$65.00
2.	"	No. 1	"	No. 3,	70.00
3.	"	No. 2	"	No. 3,	90.00
4.	"	No. 3	"	No. 3,	120.00
5.	"	No. 4	"	No. 3,	156.00
6.	"	No. 5	"	No. 3,	240.00
7.	"	No. 6	"	No. 3,	156.00
8.	"	No. 7	"	No. 3,	210.00

Other combinations may be made.

Discount.....

PRICE LIST OF STEREOPTICON ACCESSORIES.

Dissolving Key, - - - - - - - - - - - 15.00

Screens, improved opaque, on roller with fixtures.

Size,	7	8	9	10	feet square.
Price,	10.50	15.00	20.00	30.00	each.

Larger Sizes to Order.

Adjustable Lantern Stand, strongly and handsomely made of hardwood, is arranged so that the lantern can be raised or inclined at any angle so as to center properly upon the screen; easily taken apart and folded into a carrying case, 20 x 9 x 5 inches, with lock and handle, - - - - - - - - - - - - 18.00

Electric Signal, with double dry batteries and 100 feet of flexible wire on spool; in small wooden case, - - - - - - - 20.00

Compartment Slide Box, heavy cardboard and wood frame covered with black cloth, nickel-plated catch; for 50 views, - - - 2.00

Self-Centering Slide Carrier, wood, with stop, to automatically bring one view in front of the condensing lenses while another is being shown - - - - - - - - - - - 1.50

Tin Combination Carrier, for carrying and centering either English, French or American standard size unframed views, - - 1.00

Aphengoscope, a Russia iron cone to receive opaque objects and photographic cards, and project them through the lens on the screen, - - - - - - - - - - - - 10.00

Plain Slides, - - - - - - - - - - - -

Colored Slides, unframed, - - - - - - - -

Discount.....

Slides Colored to Order. **Slides Made to Order.**

TESTIMONIALS.

As a rule we do not believe in publishing testimonials concerning the excellencies of any article, prefering that it should speak for itself. But in view of the fact that we are constantly receiving requests for them, we have concluded to give a few that have come to us unsolicited.

Under date of May 5, 1896, Prof. HAMILTON L. SMITH, of Hobart College, Geneva, New York (who has been using our Generators since February last), writes us as follows:

"Today I put a charge of 2½ pounds Calcic Carbide in your No. 3 Generator, and must say here *that for convenience and nice work, indeed for satisfaction generally, it could not be improved.* The more I use it the better I like it, and I am very glad I did not return it, for I could not have made one on any different plan that would have been so satisfactory. I am more and more satisfied with Acetylene as a substitute for Oxy-Hydrogen."

Again under date of June 18th he writes:

"I want to tell you what a beautiful exhibition I made last night with the Lantern, using your No. 3 Generator. The light *burned perfectly, steadily*, and with *unchanging brightness to the end*, and I had a picture 18 feet square with enough light to be perfectly satisfactory, the details coming out very clearly. You can make what use you please of me to vouch for the performance, for I am quite sure *the doys of Oxy-Hydrogen are numbered.*"

Prof. Smith is an authority too well known in scientific circles throughout the country for us to say more as to his personality, or ability to judge the merits of Acetylene as an illuminant, and of our apparatus for generating and burning it.

"CHICAGO, June 15, 1896.

"MESSRS. WALMSLEY, FULLER & CO.

"*Gentlemen:*—About three months ago I purchased of you an Acetylene Gas Apparatus, consisting of your 'Monitor' Automatic Generator No. 3 and Quadruple Burner No. 6, for Optical Lantern projection, as a substitute for an oil lamp with four wicks, each two inches wide.

"I am delighted with it. My oil light is retired without regret. I find the Apparatus very simple and easy to manage. The light is intense but not harsh; the illumination is soft but surprisingly penetrating For use in the Stereopticon, Acetylene is *the light* for those who desire something far superior to that of the best oil lamps. After being lighted and adjusted it needs practically no further attention, giving a steady white light, with no flickering, odor, noise or smoke. I use a ½ size objective, giving a perfectly lighted 12-foot picture at a distance of 42 feet from the screen.

"In addition to my work with the lantern, I have used the Generator several times in lighting my church, which is situated beyond the limits of the city's gas supply. By actual comparison it illuminated the large audience chamber of the church as well, if not better, than twelve bracket lamps with 1½-inch wicks and two 'Mammoth Store Lamps,' all with reflectors,—the Quadruple Lantern burner being placed in the gallery front, with two single burners about 25 feet apart on either side of it, connected by rubber tubing. The gas having been lighted, the apparatus was not touched until the light was extinguished after the service, nearly two hours later.

"You are aware that this testimonial is positively unsolicited.

"REV. ED. I. GOLDSCHMIDT,
"Pastor St. Francis Xavier's Church."

"CHARLESTON, S. C., April 18, 1896.

"WALMSLEY, FULLER & CO., Chicago.

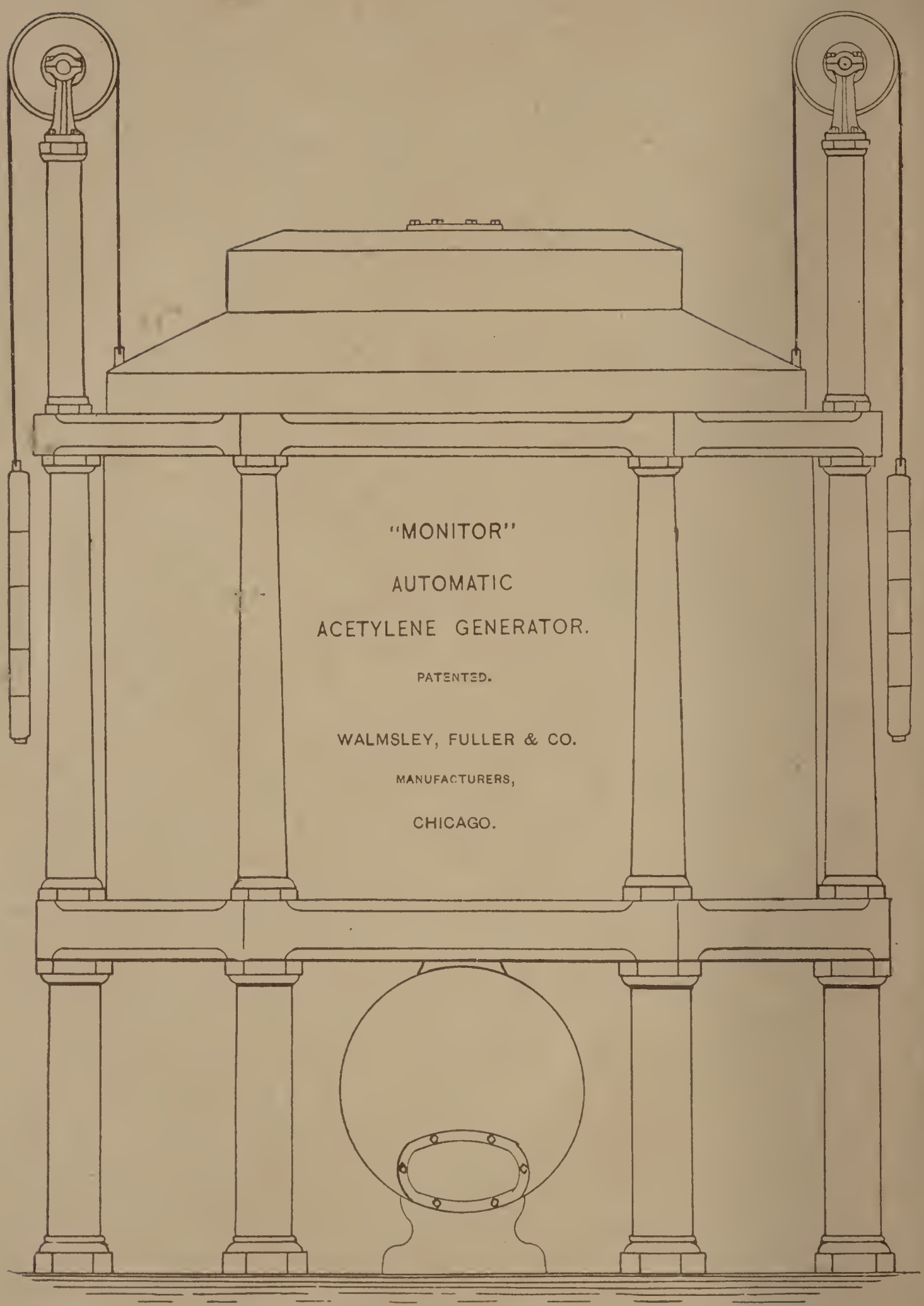
"*Gentlemen:*—My 'Monitor' Automatic Generator No. 3 to hand O. K. Last night, using a 4-4 objective, I threw the light 40 feet on a dirty, chocolate-colored wall at end of a narrow hall. The work was O. K. I do not propose to entirely give up Oxy-Hydrogen, but in the majority of places where I go, this Acetylene gas will serve me royally. It is a bother to be compelled to have compress gas shippeded a thousand miles.

S. H. KELTON,
"Lecturer and Exhibitor."

And Many Others.

We offer a few names of users of our Generators in different parts of the country:

CONCORDIA LUTHERAN CHURCH, Chicago, 75 Burners.
C. K. G. BILLINGS, Lake Geneva, Wisconsin, 100 Burners.
C. F. COX, Esq., Grand Central Depot, New York, Photo-Micrography.
F C. BEACH, Scientific American, New York.
IOWA AGRICULTURAL COLLEGE, Ames, Iowa, two outfits.
DR. W. C. BORDEN, U. S. A., Fort Snelling, Minn., Photo-Micrography.
J. EDGAR BULL, Esq., New York City, Photo-Micrography.
HON. A. A. ADEE, Department of State, Washington, D. C., Photo-Micrography.
CHICAGO GAS LIGHT AND COKE COMPANY.
MICHIGAN CARBIDE COMPANY, Detroit, Michigan.
ACETYLENE LIGHT, HEAT AND POWER COMPANY, Philadelphia.
STATE NORMAL SCHOOL, Shippensburg, Pennsylvania.
X. O. HOWE, 22 South Paulina St., Chicago, Photographer.
PROF. A. L. RUSSELL, Normal Institute, Chillicothe, Missouri.
STAR PHOTO COMPANY, Milwaukee, Wisconsin.
DAVID ABBOTT, Lincoln, Nebraska.
HON. WATSON LAMONT, Cobleskill, New York.
PROF. J. O. TIFFANY, Attleborough, Massachusetts.
ST. IGNATIUS MISSION, St. Ignatius, Montana.
SCHOOL BOARD, Webster, Massachusetts.
A. C. CLACK, Aberdeen, Washington.
REV. ALFRED KUMMER, Oakland, California.
CHICAGO CYCLO-OPTICON COMPANY.
REV. ROBERT N. GARRETT, Ashland, Kentucky.
E. HUDSON, Hartford Times, Hartford, Connecticut.
LIGHTHOUSE BOARD, Tompkinsville Station, Staten Island, New York.
S. J. I. JOHNSON, Dallas, Texas.
C. E. HEQUEMBOURG, Esq., Dunkirk, New York.
GONZAGA COLLEGE, Spokane, Washington.
IOWA WESLEYAN UNIVERSITY, Mount Pleasant, Iowa.
REV. S. W. INGHAM, Medford, Wisconsin.
TORRINGTON SURGICAL APPLIANCE COMPANY, Torrington, Connecticut.



The "MONITOR" Automatic Acetylene Generator for Villages, Towns and Cities.

Estimates furnished for complete Acetylene Gas Plants.

WALMSLEY, FULLER & CO.,
Manufacturers,
CHICAGO.